

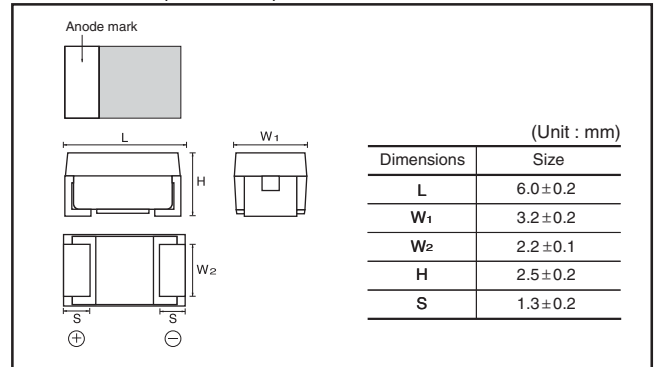
Chip tantalum capacitors with (Fail-safe open structure type)

TCFG series C Case

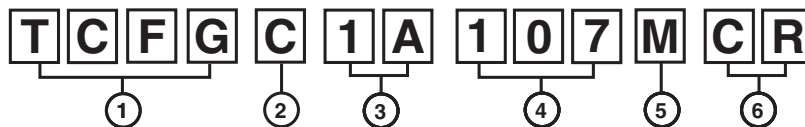
●Features

- 1) Safety design by open function built - in.
- 2) Wide capacitance range
- 3) Screening by thermal shock.

●Dimensions (Unit : mm)



●Part No. Explanation



① Series name
TCFG

② Case code
C

③ Rated Voltage

Rated voltage (V)	4	6.3	10	16	25
CODE	0G	0J	1A	1C	1E

④ Capacitance
Nominal capacitance in pF in 3 digits : 2significant figure representing the number of 0's.

⑤ Capacitance tolerance
M : ±20%

⑥ Taping
C : Reel width (12mm)
R : Positive electrode on the side opposite to sprocket hole

●Capacitance range

(μF)	Rated voltage (V.DC)					
	4	6.3	10	16	20	25
15 (156)						C
22 (226)						
33 (336)						
47 (476)				C		
68 (686)						
100 (107)			C			
150 (157)		C				
220 (227)	C *					

Remark) Case size codes (C) in the above show each size products line-up.

* : Under development

●Marking

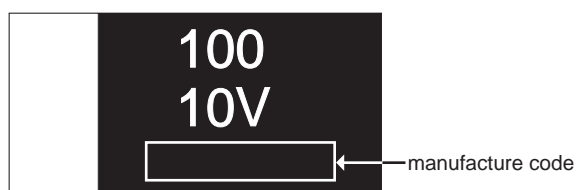
The indications listed below should be given on the surface of a capacitor.

- ① Polarity : The polarity should be shown by □ bar. (on the anode side)
- ② Rated DC voltage
- ③ Nominal capacitance

[C Case] note 1) Visual typical example (1) capacitance code (2) voltage code

(1) 100μF

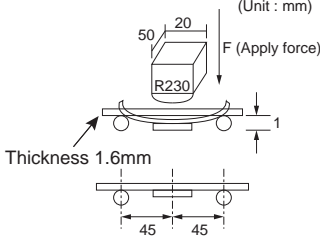
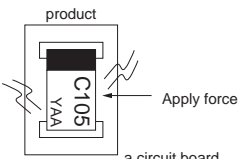
(2) 10V



note 2) voltage code and capacitance code are variable with parts number

●Characteristics

Item		Performance						Test conditions (based on JIS C5101-1 and JIS C5101-3)															
Operating Temperature		-55 °C to +125 °C						Voltage reduction when temperature exceeds +85°C															
Maximum operating temperature with no voltage derating		+85 °C																					
Rated Voltage (V.DC)		4	6.3	10	16	25			at 85°C														
Category Voltage (V.DC)		2.5	4	6.3	10	16			at 125°C														
Surge Voltage		5.0	8	13	20	32			at 85°C														
DC leakage current		0.5μA or 0.01CV whichever is greater (Shown in "Standard list")						As per 4.9 JIS C 5101-1 As per 4.5.1 JIS C 5101-3 Voltage : Rated voltage for 1 min															
Capacitance tolerance		Shall be satisfied allowance range. ±20%						As per 4.7 JIS C 5101-1 As per 4.5.2 JIS C 5101-3 Measuring frequency : 120±12Hz Measuring voltage : 0.5Vrms, +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit															
Tangent of loss angle (Df, tanδ)		Shall be satisfied the voltage on "Standard list"						As per 4.8 JIS C 5101-1 As per 4.5.3 JIS C 5101-3 Measuring frequency : 120±12Hz Measuring voltage : 0.5Vrms, +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit															
Impedance		Shall be satisfied the voltage on "Standard list"						As per 4.10 JIS C 5101-1 As per 4.5.4 JIS C 5101-3 Measuring frequency : 100±10kHz Measuring voltage : 0.5Vrms or less Measuring circuit : DC Equivalent series circuit															
Resistance to soldering heat	Appearance	There should be no significant abnormality. The indications should be clear.						As per 4.14 JIS C 5101-1 As per 4.6 JIS C 5101-3															
	L.C	Less than initial limit						Dip in the solder bath															
	ΔC / C	Within ±10% of initial value						Solder temp : 260±10°C Duration : 5±0.5s															
	tanδ	Less than 150% of initial limit						Repetition : 1 After the specimens, leave it at room temperature for over 24h and then measure the sample.															
Fail-Safe open unit actuation		Within 320°C – 20s						Dip in the solder bath Solder temp : 330±5°C															
Temperature cycle	Appearance	There should be no significant abnormality.						As per 4.16 JIS C 5101-1 As per 4.10 JIS C 5101-3															
	L.C	Less than initial limit						Repetition : 5 cycles (1 cycle : steps 1 to 4) without discontinuation.															
	ΔC / C	Within ±20% of initial value																					
	tanδ	Less than 150% of initial limit						<table><tr><td>Step</td><td>Temp.</td><td>Time</td></tr><tr><td>1</td><td>-55±3°C</td><td>30±3min</td></tr><tr><td>2</td><td>Room temp.</td><td>3min. or less</td></tr><tr><td>3</td><td>125±2°C</td><td>30±3min</td></tr><tr><td>4</td><td>Room temp.</td><td>3min. or less</td></tr></table> After the specimens, leave it at room temperature for over 24h and then measure the sample.		Step	Temp.	Time	1	-55±3°C	30±3min	2	Room temp.	3min. or less	3	125±2°C	30±3min	4	Room temp.
Step	Temp.	Time																					
1	-55±3°C	30±3min																					
2	Room temp.	3min. or less																					
3	125±2°C	30±3min																					
4	Room temp.	3min. or less																					
Moisture resistance	Appearance	There should be no significant abnormality. The indications should be clear.						As per 4.22 JIS C 5101-1 As per 4.12 JIS C 5101-3															
	L.C	Less than initial limit						After leaving the sample under such atmospheric condition that the temperature and humidity are 60±2°C and 90 to 95%RH, respectively, for 500±24h level it at room temperature for over 24h and then measure the sample.															
	ΔC / C	Within ±20% of initial value																					
	tanδ	Less than 150% of initial limit																					

Item		Performance	Test conditions (based on JIS C5101-1 and JIS C5101-3)
Temperature Stability	Temp.	-55°C	As per 4.29 JIS C 5101-1 As per 4.13 JIS C 5101-3
	$\Delta C / C$	Within 0/-12% of initial value	
	$\tan \delta$	Shall be satisfied the voltage on "Standard list"	
	L.C	—	
	Temp.	+85°C	
	$\Delta C / C$	Within +12/0% of initial value	
	$\tan \delta$	Shall be satisfied the voltage on "Standard list"	
	L.C	Less than 1000% of initial limit	
	Temp.	+125°C	
	$\Delta C / C$	Within +15/0% of initial value	
	$\tan \delta$	Shall be satisfied the voltage on "Standard list"	
	L.C	Less than 1250% of initial limit	
Surge Voltage	Appearance	There should be no significant abnormality.	As per 4.26 JIS C 5101-1 As per 4.14 JIS C 5101-3 Apply the specified surge voltage every 5±0.5min. for 30±5 s. each time in the atmospheric condition of 85±2°C. Repeat this procedure 1,000 times. After the specimens, leave it at room temperature for over 24h and then measure the sample.
	L.C	Less than initial value	
	$\Delta C / C$	Within ±12% of initial value	
	$\tan \delta$	Less than 150% of initial limit	
Loading at High temperature	Appearance	There should be no significant abnormality.	As per 4.23 JIS C 5101-1 As per 4.15 JIS C 5101-3 After applying the rated voltage for 2000+72/0h without discontinuation via the serial resistance of 3Ω or less at a temperature of 85±2°C, leave the sample at room temperature/humidity for over 24h and measure the value.
	L.C	Less than 125% of initial limit	
	$\Delta C / C$	Within ±20% of initial value	
	$\tan \delta$	Less than 150% of initial limit	
Terminal Strength	Capacitance	The measured value should be stable.	As per 4.35 JIS C 5101-1 As per 4.9 JIS C 5101-3 A force is applied to the terminal until it bends to 1mm and by a prescribed tool maintain the condition for 5s. (See the figure below.)
	Appearance	There should be no significant abnormality.	
 <p>(Unit : mm)</p> <p>50 20</p> <p>R230</p> <p>F (Apply force)</p> <p>Thickness 1.6mm</p> <p>45 45</p>			
Adhesiveness		The terminal should not come off.	<p>As per 4.34 JIS C 5101-1 As per 4.8 JIS C 5101-3 Apply force of 5N in the two directions shown in the figure below for 10±1s after mounting the terminal on a circuit board.</p>  <p>product</p> <p>C105</p> <p>VAA</p> <p>Apply force</p> <p>a circuit board</p>

Item		Performance	Test conditions (based on JIS C5101-1 and JIS C5101-3)
Dimensions		Be based on "External dimensions"	Measure using a caliper of JIS B 7505 Class 2 or higher grade.
Resistance to solvents		The indication should be clear.	As per 4.32 JIS C 5101-1 As per 4.18 JIS C 5101-3 Dip in the isopropyl alcohol for 30±5s, at room temperature.
Solderability		3/4 or more surface area of the solder coated terminal dipped in the soldering bath should be covered with the new solder.	As per 4.15.2 JIS C 5101-1 As per 4.7 JIS C 5101-3 Dip speed = 25±2.5mm/s Pre-treatment (accelerated aging) : Leave the sample on the boiling distilled water for 1h. Solder temp. : 245±5°C Duration : 3±0.5s Solder : M705 Flux : Rosin 25%, IPA 75%
Vibration	Capacitance	Measure value should not fluctuate during the measurement.	As per 4.17 JIS C 5101-1 Frequency : 10 to 55 to 10Hz/min. Amplitude : 1.5mm Time : 2h each in X, Y and Z directions Mounting : The terminal is soldered on a print circuit board.
	Appearance	There should be no significant abnormality.	

●Standard list, TCFG series C Case

Part No.	Rated Voltage @85°C (V)	Derated Voltage @ 125°C (V)	Surge Voltage @85°C (V)	Capacitance 120Hz (μF)	Tolerance (%)	Leakage current 25°C 1WV.60s (μA)	DF 120Hz (%)			Impedance 100kHz (Ω)	Case code
							-55°C	25°C 85°C	125°C		
* TCFG C 0G 227 MCR	4	2.5	5	220	±20	8.8	30	12	16	1.3	C
TCFG C 0J 157 MCR	6.3	4	8	150	±20	9.5	30	12	16	1.3	C
TCFG C 1A 107 MCR	10	6.3	13	100	±20	10.0	14	10	12	1.3	C
TCFG C 1C 476 MCR	16	10	20	47	±20	7.5	12	8	10	1.6	C
TCFG C 1E 156 MCR	25	16	32	16	±20	3.8	14	10	12	1.3	C

* = Under development

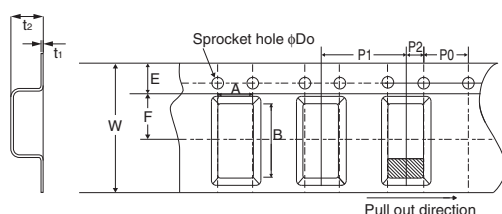
●Packaging specifications

(Unit : mm)

	A	B ± 0.2	W ± 0.2	E ± 0.1	F ± 0.05	P ± 0.1
Case code	3.7 $^{+0.1}_{-0.2}$	6.4 $^{+0.1}_{-0.2}$	12	1.75	5.5	8.0
C (6032)	P ± 0.05	P ± 0.1	D ± 0.1	t ± 0.05	t ± 0.1	
	2.0	4.0	$\phi 1.5$	0.3	3.0	

Taping

C case

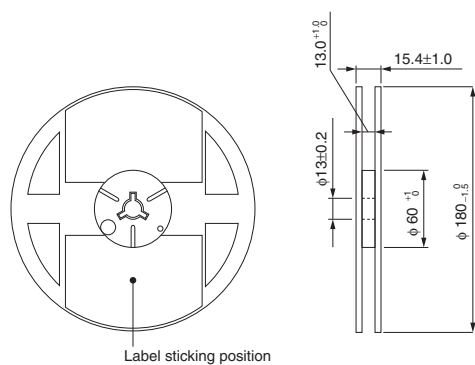


●Packaging style

Case size	Packaging	Packaging style		Symbol	Basic ordering unit
C Case	Taping	Plastic taping	$\phi 180$ mm reel	CR	500

Reel

Plastic reel



(Unit : mm)

EIAJ ET - 7200A

Notes

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